



# **Landfill Gas-to- Energy Economics**

Tom Kerr  
Climate Protection Division  
US EPA



# Presentation Overview

- F 2000 LMOP Database Findings
- F Industry Trends
- F Project Economics



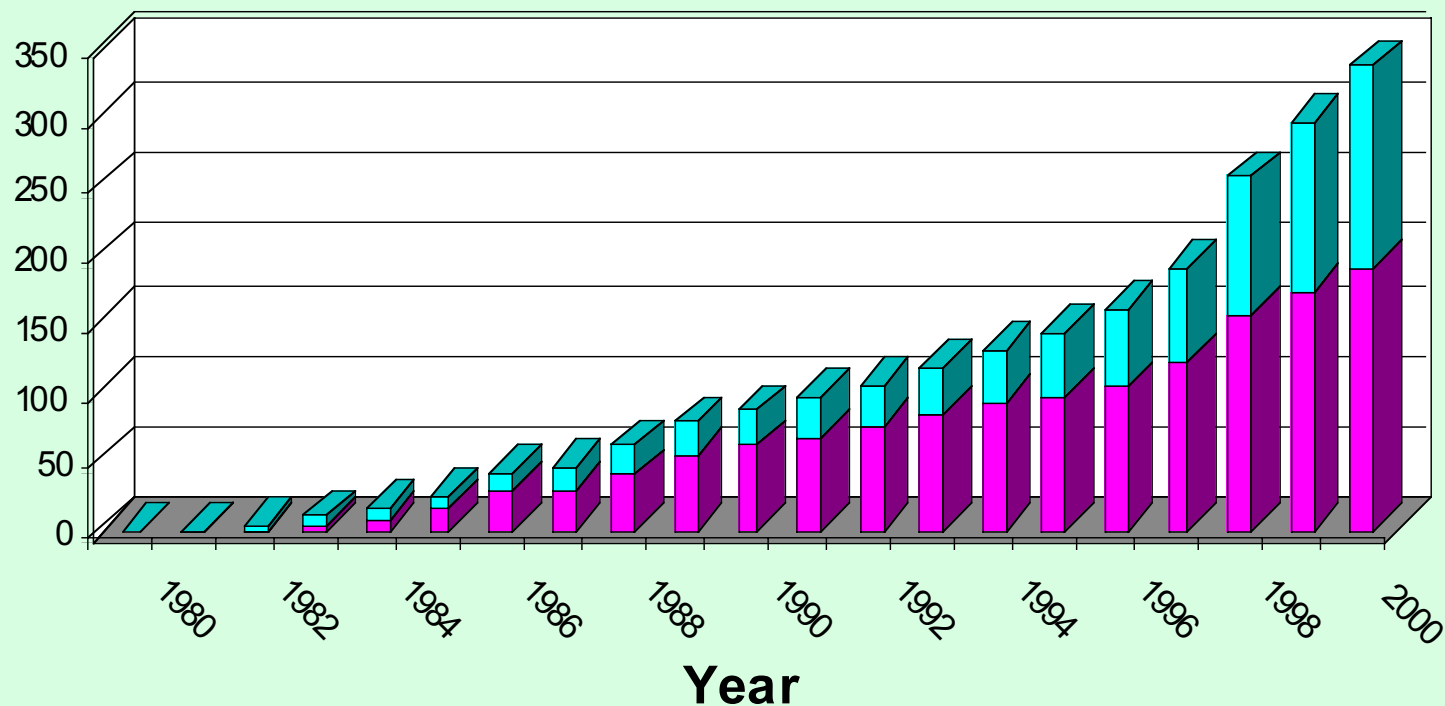
# LMOP Database

- F LMOP projects database
  - landfill characteristics, including NSPS/EG status
  - LFG project type and project developer
  - LFG generation rates
- F Tracks existing, under construction, shut down, and planned projects
- F Calculates environmental benefits of LFG utilization



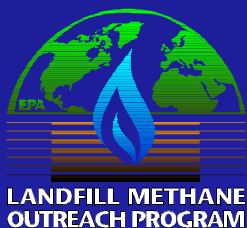
# Operational LFGTE Projects

# of  
Landfills



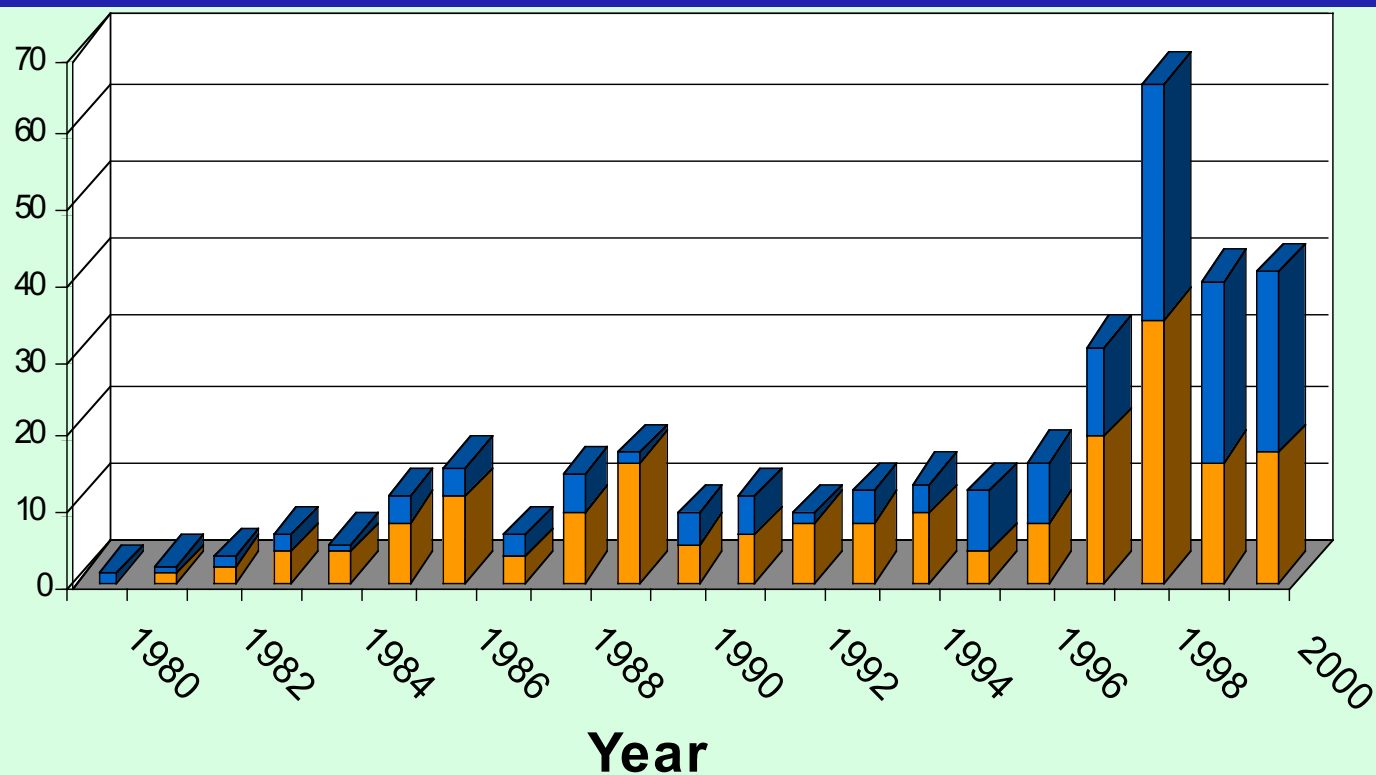
■ At NSPS Landfills

■ At Non-NSPS Landfills



# Incremental LFG Projects

# of  
Landfills



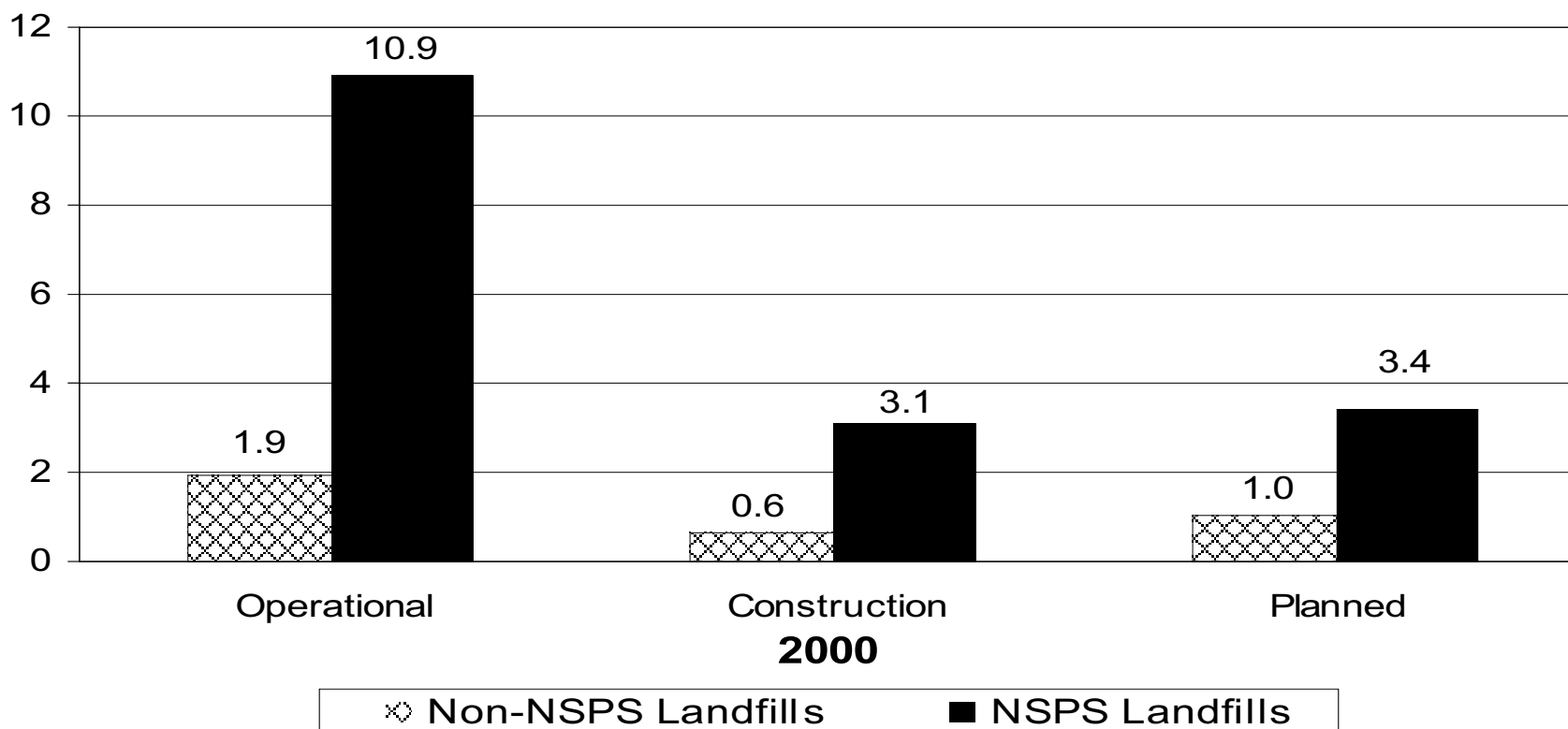
At NSPS Landfills

At Non-NSPS Landfills



# GHG Emission Benefits From LFG Projects

**Figure 3: Estimated Annual Carbon Equivalent Emission Benefits  
From Operational LFGTE Projects At NSPS And Non-NSPS  
Landfills**





# LFG Industry Trends

- F LFG industry growth expected to continue:
  - 500 + good sites left
  - Continue trend from electricity to direct use projects
  - Continue trend from large to smaller projects
  - Increased landfill gas capture and project efficiency
    - q improved well maintenance; expanded well fields
    - q permit changes
    - q system automation



# LFG Project Economics

- F Project economics include
  - LFG collection system and backup flare
  - energy utilization system
  - interconnection/pipeline to user
  - financing/permitting/soft costs
- F NSPS site owners bear the cost of collection system/flare
- F NOTE: no fuel costs!!





# Typical LFG Project Costs

## F Capital costs

- Electricity Generation: \$900-1300/kW installed (at least 4 cents/kWh buyback rate)
- Direct Use: \$6-13/mmBtu/year (\$/mmBtu)

## F O & M costs over project lifetime

- Electricity Generation: 1.5-1.8 cents/kWh
- Direct Use: 13 - 74 cents/mmBtu/year



# LFG Economic Drivers

- F Federal tax credits (worth ~ 1 cent/kWh)
- F DOE's REPI payments
- F State grant/loan programs
- F Green pricing/marketing programs
- F Local tax incentives/economic development
- F GHG credit trading



# Introduction To LMOP

- F Created in 1994 under the Climate Change Action Plan
- F Voluntary program
  - serves as a resource for landfill gas-to-energy project development
- F Mission
  - create alliances between states, energy users/providers, landfill gas industry, and communities
  - lower barriers and promote development of cost-effective projects



# Use LMOP Resources

- F Program Managers
- F Project Development Handbook
- F Profiles of Candidate Landfills - 31 states
- F E-PLUS Project Evaluation Software
- F Landfill NSPS/EG Guidance Booklet
- F Guidance Document for State/Local Permitting Authorities
- F Technical Issues Papers
- F State Primers
- F More....
- F LMOP Hotline  
1-888-782-7937



# Let the LMOP Help You

## F Territory 1: Shelley Cohen

(CT,DE,ME,MD,MA,NH,NJ,NY,NC,PA,RI,SC,TN,VA,VT)

202-564-9797, [cohen.shelley@epa.gov](mailto:cohen.shelley@epa.gov)

## F Territory 2: Ed Coe

(IK,IN,KY,MI,MN,OK,WI)

202-564-8994, [coe.edmund@epa.gov](mailto:coe.edmund@epa.gov)

FIND US  
ON THE WEB AT  
[WWW.EPA.GOV/LM](http://WWW.EPA.GOV/LM)

## F Territory 3: Brian Guzzone

(AZ,CA,CO,HI,KS,LA,NM,NV,OK,TX,UT)

202-564-2666, [guzzone.brian@epa.gov](mailto:guzzone.brian@epa.gov)

## F Territory 4: Julie Gourley

(AK,AL,AR,FL,GA,IA,ID,MO,MS,MT,ND,NE,OR,SD,WA,WY)

202-564-1424, [gourley.julie@epa.gov](mailto:gourley.julie@epa.gov)